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(19) (CA) **CANADIAN PATENT** (12)

(54) WATTHOUR METER AND BATTERY RETAINING APPARATUS
THEREFORE

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(73) Granted to General Electric Company
U.S.A.

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No. OF CLAIMS 17

Canada

WATTHOUR METER AND BATTERY RETAINING APPARATUS THEREFOREABSTRACT OF THE DISLCOSURE

An apparatus for retaining a replaceable battery comprised of a unitary structure having a chamber therein for receiving a battery and a resilient retaining means cooperating in the chamber with the battery provides a structure for easily replacing a battery. The apparatus is particularly adaptable to a programmable electrical watthour meter where a battery and programming connector in the watthour meter must be accessed through an access port in a housing of the watthour meter to replace the battery and service the watthour meter.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

5 1. Apparatus for retaining a replaceable battery comprising:

(a) a unitary structure characterized by a rigid material having first and second oppositely disposed ends and including therein a chamber longitudinally extending between the oppositely disposed ends, said chamber having an opening in at least one of the ends and having a wall for surroundingly supporting a battery to be inserted into the chamber from the open end;

10 (b) a retaining means for retaining said battery in the chamber of said unitary structure, said retaining means characterized by an elongated member of resilient spring material, said elongated member having a lip formed on each end thereof, each lip extending substantially perpendicularly in the same direction from said elongated member and at a predetermined angle with respect thereto;

15 and

(c) means, including said retaining means and said unitary structure, for mounting said retaining means on said unitary structure with a first lip of said retaining means disposed in the chamber at the first end of said unitary structure and a second lip of said retaining means disposed in the chamber at the second end of said unitary structure, one of the lips of said retaining means providing sufficient clearance in the chamber opening to allow said battery to be inserted into the chamber, whereby,

20 when said battery is being inserted into the chamber, one of the first and second lips contacts one terminal end of said battery, while the other lip slidably engages the outside surface of said battery creating concurrent and opposing forces at opposite ends of said elongated member causing said elongated member to bend and to thereby cause

25 said other lip to slide off of the outside surface of said

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battery and snap over the other terminal end of said battery, when said battery is fully inserted into the chamber, to thus securely retain said battery in the chamber of said structure.

5 2. The apparatus in accordance with claim 1, wherein said retaining means further includes an electrical contact on each of said first and second lips which makes electrical contact with the terminal ends of the battery while said battery is retained in the chamber of said unitary structure.

10 3. The apparatus in accordance with claim 2, wherein said battery has a rim portion as part of the terminal end thereof which comes into contact with the electrical contact on that lip of said retaining means which snaps over the other terminal end of said battery.

15 4. The apparatus in accordance with claim 2, wherein at least one of the electrical contacts on said first and second lips is electrically insulated from said retaining means.

20 5. The apparatus in accordance with claim 1, further including a spring member mounted at one end thereof to the end of said unitary structure opposite the chamber opening, the other end of said spring member exerting pressure on said one of said first and second lips to cantilever said elongated member toward the wall of said chamber to thereby move said other lip of said elongated member outward of the chamber, whereby the battery may be easily inserted into the chamber.

25 6. The apparatus in accordance with claim 1, wherein said retaining means is mounted inside the chamber of said unitary structure and secured at one end thereof to that end of said unitary structure opposite the chamber opening to cause bending of said elongated member due to the concurrent and opposing forces created by the lips bearing against said battery.

30 7. The apparatus in accordance with claim 6, wherein the chamber of said unitary structure further

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includes a channel formed in the wall thereof in which said elongated member is mounted by securing said elongated member in the wall adjacent the channel.

8. Apparatus having a replaceable battery comprising:

(a) a housing, said housing having an access port therein for the installation and removal of a replacement battery and the insertion of a probe;

(b) an electronic circuit board positioned inside the housing, said electronic circuit board having connecting pins thereon concentrically aligned with the access port of said housing and within a circumferential area smaller than the periphery of the access port, whereby a probe can be inserted through the access port in mating electrical contact with the connecting pins of said electronic circuit board;

(c) a unitary structure characterized by a rigid material having oppositely disposed ends and including therein a cylindrical chamber, smaller in diameter than the access port in said housing, and longitudinally extending between the oppositely disposed ends, said chamber having an opening in at least one of the ends and having a wall for surroundingly supporting a battery to be inserted into the chamber from the open end, said unitary structure being positioned inside the housing with the chamber opening concentrically aligned with the access port of said housing, whereby a replacement battery can be inserted into the chamber through the access port, said unitary structure further including, a retaining means for retaining said battery in the chamber of said unitary structure, said retaining means characterized by an elongated member of resilient spring material having a lip formed on each end thereof, each lip extending substantially perpendicularly in the same direction from said elongated member and at a predetermined angle with respect thereto, and each lip including an electrical

contact for contacting opposite terminal ends of said battery, said retaining means being mounted on said unitary structure with a first lip of said retaining means disposed in the chamber at one end of said unitary structure and a second lip of said retaining means disposed in the chamber opening at the other end of said unitary structure, the second lip being disposed to provide sufficient clearance in the chamber opening to allow said battery to be inserted into chamber, whereby, when said battery is being inserted into the chamber, through the access port, the first lip of said retaining means contacts one terminal end of said battery, while the second lip slidably engages the outside surface of said battery creating concurrent and opposing forces at opposite ends of said elongated member causing said elongated member to bend and to thereby cause the second lip to slide off of the outside surface of said battery and snap over the other terminal end of said battery, when said battery is fully inserted into the chamber, to thus securely retain said battery in the chamber of said unitary structure; and

(d) means connecting the electrical contact of each lip of said retaining means to said electronic circuit board for completing an electrical circuit therebetween.

9. The apparatus in accordance with claim 8, further including a spring member mounted at one end thereof to the end of said unitary structure opposite the chamber opening, the other end of said spring member exerting pressure on the first lip to cantilever said elongated member toward the wall of said chamber to thereby move the second lip of said elongated member outward of the chamber, whereby the battery may be easily inserted into the chamber.

10. The apparatus in accordance with claim 8, wherein the battery has a rim portion as a part of the terminal end thereof which comes into contact with the

electrical contact on the second lip of said retaining means.

11. The apparatus in accordance with claim 8, wherein at least one of the electrical contacts on said first and second lips is electrically insulated from said retaining means.

12. The apparatus in accordance with claim 8 further including a probe guide secured to said electronic circuit board and being formed to at least partially surround the connecting pins on said electronic circuit board, said probe guide being concentrically aligned with the access port of said housing for guiding the probe, when inserted through the access port, into electrical contact with the connecting pins on said electronic circuit board.

13. Apparatus for retaining a replaceable battery comprising:

(a) a unitary structure characterized by a rigid material having first and second oppositely disposed ends and including an open-ended cylindrical chamber longitudinally extending through the structure between the ends, said chamber having a wall for surroundingly supporting a battery to be inserted into the chamber from one of the open ends, and further having a channel in the wall and extending longitudinally with the chamber between the ends of said unitary structure; and

(b) a retaining means for retaining said battery in the chamber of said unitary structure, said retaining means being characterized by and including,

(1) an elongated member of resilient spring material, said elongated member having first and second lips of substantially rigid material, with a lip being formed on each end of said elongated member, each lip extending substantially perpendicularly in the same direction from said elongated member and at a

predetermined angle with respect thereto, and

(2) means on the first lip end of said elongated member for mounting said retaining means on the first end of said unitary structure, said elongated member being longitudinally disposed in the channel in the chamber wall with the first lip of said retaining means disposed in the chamber at the first end of said unitary structure and the second lip of said retaining means disposed in the chamber at the second end of said unitary structure, the second lip of said retaining means providing sufficient clearance in the chamber opening to allow said battery to be inserted into the chamber at the second end of said unitary structure, whereby, when said battery is being inserted into the chamber, the first lip of said retaining means contacts one terminal end of said battery, while the second lip of said retaining means slidingly engages the outside surface of said battery creating concurrent and opposing forces at opposite ends of said elongated member causing said elongated member to bend longitudinally in the channel and to thereby cause the second lip of said retaining means to slide off of the outside surface of said battery and snap over the other terminal end of said battery, when said battery is fully inserted into the chamber, to thus securely retain the battery in the chamber of said unitary structure.

14. The apparatus in accordance with claim 13, further including a spring member mounted at one end thereof to the first end of said unitary structure, the other end of said spring member exerting pressure on the first lip to cantilever said elongated member into said channel to thereby move the second lip of said elongated member outward of the chamber, whereby the battery may be

easily inserted into the chamber.

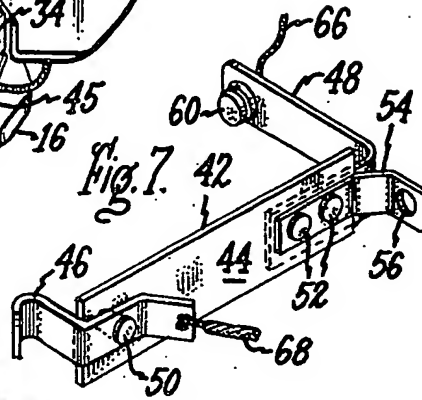
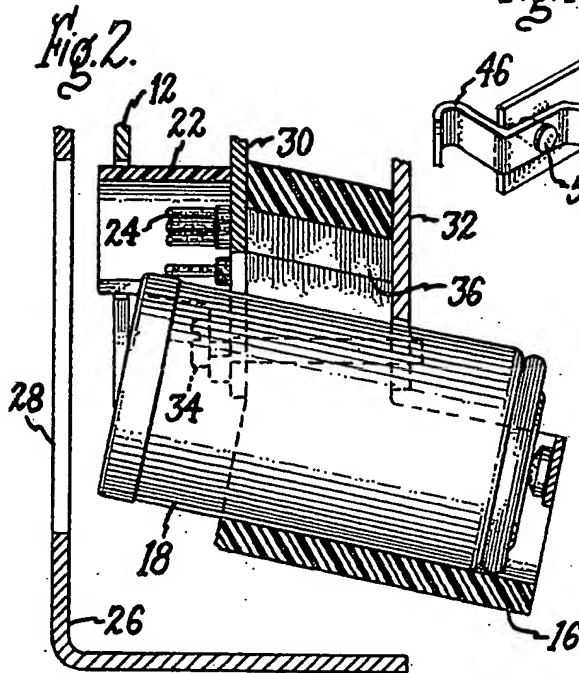
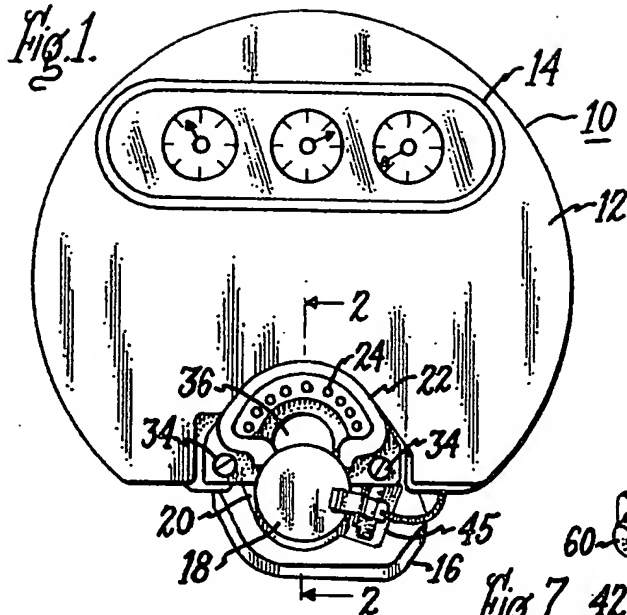
15. The apparatus in accordance with claim 13,
wherein said retaining means further includes an electrical
contact on each of said first and second lips which makes
5 electrical contact with the terminal ends of the battery
while said battery is retained in the chamber of said
unitary structure.

16. The apparatus in accordance with claim 15,
whereby said battery has a rim portion as a part of the
10 terminal end thereof which comes into contact with the
electrical contact on the second lip of said retaining
means.

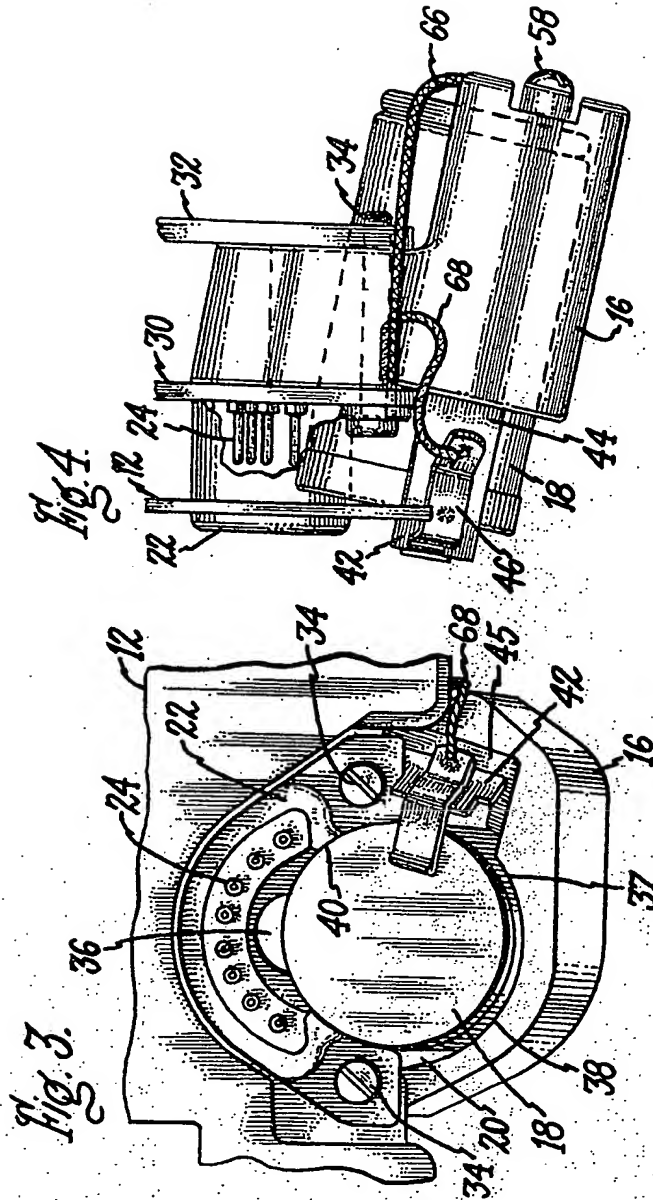
17. The apparatus in accordance with claim 15,
wherein at least one of the electrical contacts on said
15 first and second lips is electrically insulated from
said retaining means.

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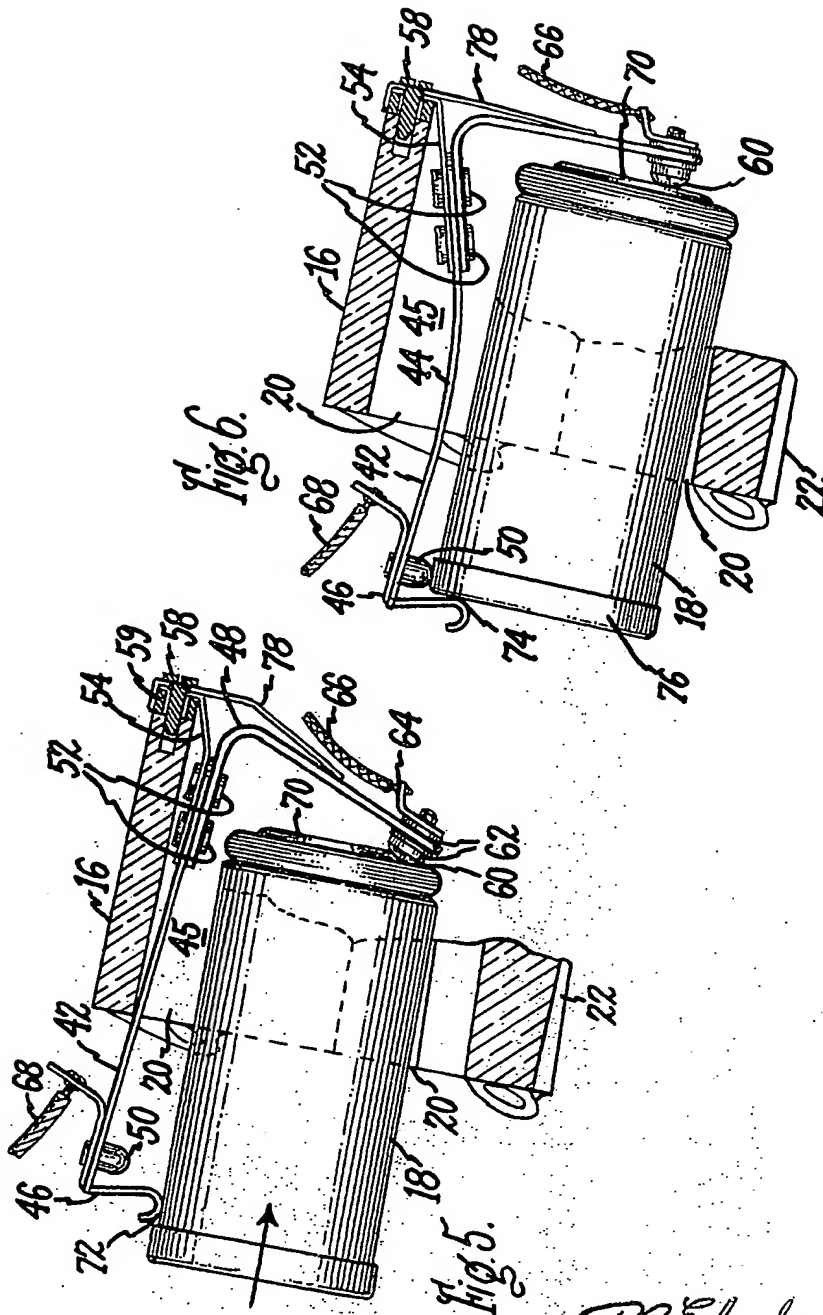
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